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Short Communication

Climate Change, Acupuncture and Traditional Chinese Herbal Medicines

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ABSTRACT

Introduction: China is the vast country which has the highest population and providing enough and stable food is a challenge in China, and climate change is expected to exacerbate problems. **Methods:** Literature search was conducted in Medline, Research gate, Scopus, PubMed and Google scholar databases. The keywords were climate change, acupuncture, traditional Chinese medicine and health benefits. **Results:** Climate Change will influence distribution of agricultural production, food supply and global markets in Asia and the world. The impact of climatic changes on agriculture can be divided into shift in climatic and agriculture zones, impact on plant growth and crop production, impact on agriculture soil such as soil organic matter, soil fertility, biological health of soil, soil erosion, soil water availability, and of course increase in number of pests, plant diseases and weeds. Traditional Chinese medicine uses five phase theory to describe the relationship between five zang and their physiological function, five zang and structure and function of various parts of the human body, and also the correlation between each part of human body and nature and society. Not only were the ancient Chinese scholars aware of Qi, the immaterial medium that connects between different parts of a body and speaks the intelligence of the body; they also recognized that nature, just like the human body, communicates between its different parts through its own Qi and the climate pattern. Farmers should adapt to climate change strategies which integrate traditional experience and indigenous knowledge with scientific researches and government polices as key factors. Because of climate change, China will be more vulnerable to droughts, heavy rains and heat waves. **Conclusion:** Climate change will extend growing seasons for some crops and make shorter growing seasons for other crops in North part of China and will bring less reliable rains, soils that retain less water, the spread of dangerous pests and unwanted weeds.

Key words: Climate Change, Traditional Chinese Medicine, Sustainability, Agricultural Production.

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INTRODUCTION

Traditional Chinese Medicine (TCM) has a history of thousands of years it is formed by summarizing the precious experience of understanding life, maintaining health and fighting diseases accumulated in daily life, production and medical practice.[1-7] Acupuncture is also a technique in which practitioners stimulate specific points on the body. Acupuncture may help reduce pain. Both Acupuncture and Chinese herbal remedies date back at least 2200 years, although, the earliest known written record of Chinese medicine is related to 3rd century BCE. According to TCM, a person is healthy when harmony exists between two forces; illness is also result from a breakdown in the equilibrium of yin and yang. Western medicine focuses mainly on treating disease, but TCM looks at the entire well-being. It is both systematic theories and also has abundant preventative and therapeutic methods for diseases.[8-13] Global warming has been an issue in many aspects and the impacts of future climate change on many sectors such as agriculture, forestry, water, energy, ecosystem, and health have been controversial.[14] Climate Chang has already caused significant impacts on water resources, food security, human health especially in Africa and Asia.[15] China encompasses various climate regimes from northern boreal to southern tropical and from western arid to eastern and southern humid climate zones. Three major issues about climate change in China can divided to: a) The effects of climate change on the inland aquaculture sector, b) The effects of climate change on grain and forage agricultural production, c) The development of the total factor productivity and its determinants on agriculture sector. Research on the social impacts of past climate change would not only prove that past climate change affected human society, but also explain the processes and mechanisms of these impacts, including their positive and negative implications for human society.[16] Traditional Chinese medicine is indigenous to the Chinese and is therefore classified as a traditional medicine and when it is used by non-Chinese ethnicities, it is called a complementary medicine. The five phase's theory defines the nature of matters based on the related characteristics of wood, fire, earth, metal and water. The five phases maintain the generation and restriction relationship among them. Traditional Chinese medicine uses five phase theory to describe the relationship between five zang and their physiological function, five zang and structure and function of various parts of the human body and also the correlation between each part of human body and nature and society. Farmers are particularly vulnerable to extreme weather fluctuations brought by climate change. When unusual flooding, droughts, early frost, and late frosts occur, crop yields are affected which impact farm profit. Additionally, increased diseases in soil due to hotter days and changes in insect patterns, which are at times unseen of before, all impact farm operations. With unpredictable weather patterns, farmers are often unable to respond proactively to these fluctuations. Other times, even a proactive approach cannot change nature's course. Chinese agricultural production has increased in recent past 30 years, although rising average temperature and declining land area sown has increased. China has played a crucial role in advancing key elements of the foundations for future development and the global agenda by taken major steps to advance international cooperation, especially on climate change. China has also participated in forms of transnational governance such as the Gold Standard, a carbon credit certification scheme. China's current goal is to maintain a food self-sufficiency rate of around 90-95%. China has already made progress by decreasing its reliance on coal, increasing investments in clean energy and shifting its economy away from heavy industry. China also needs to safeguarding the resource base, improving

resource use efficiency, particularly fertilizer nutrients and water, reduce non-point pollution and other environmental impacts, mainstream agricultural climate change mitigation in low-carbon management through innovative mechanisms such as clean development mechanism and ecosystem service payments, reduce food waste in all stages of the food chain and promoting sustainable food consumption, and integrated approaches to catchment management and manure management. When it comes to climate change, improving education, training and public awareness on this issue is also an important parameter, which is why in recent years, Chinese government and Chinese Academic centres have strengthened the training and education on climate change with noticeable efforts in enhancing the general public awareness of climate change and of course promoting sustainable development inside mainland China. One of the most important efforts to strengthen scientific researches and technology innovation in China related to climate change are, to reach advanced levels in research on climate change in related fields, to make remarkable progress in technology on energy development, energy conservation and clean energy and to improve adaptation technology in agriculture and forestry. The concept of restoring balance is an integral part of traditional Chinese medicine. Chinese medicine's understanding of yin and yang allows us to see that personal health comes from balance and that if people are to address the destabilization of the climate, people need to address the condition of the internal environment. Not only were the ancient Chinese scholars aware of Qi, the immaterial medium that connects between different parts of a body and speaks the intelligence of the body; they also recognized that nature, just like the human body, communicates between its different parts through its own Qi and the climate pattern. Haque *et al.*[17] reported that a systematic collection of knowledge on the use of traditional medicines to cope with climate-sensitive diseases can help the adaptation of communities vulnerable to climate change. They have also noted that it could increase the health coping capacity of people in a resource-poor setting and contribute to their adaptation capabilities. Dashtdar *et al.*[18] explained the concepts of win in traditional medicine books and they have concluded that Chinese medicine is applicable for public health specialists, traditional and complementary medicine practitioners and those who are interested in historical medicine and provides a theoretical basis for herbal drugs or acupuncture administration to eliminate wind in order to treat various diseases. Kelly[19] noted that prevalent assumptions about climate change held in the industrialized West through the lens of Chinese medicine, an explores deep-reaching philosophical understandings from classic Chinese medical texts that have much to offer in discussions about- an action towards climate stabilization.

CONCLUSION

In the Chinese philosophy, climate means the Qi of nature. It is reminding the world that nature is larger body and human are each a cell of this body and both the cell and the body have their own level of intelligence. If either the body or the cell claims the dominance of its intelligence without the awareness of the other, people have diseases. Global climate change is likely to change the frequency of extreme weather events: tropical cyclones may increase as sea surface waters warm; floods may increase as the hydrological cycle intensifies; and heat waves may increase in mid-continental locations. Climate change represents an external influence on agricultural production, which is beyond the control of producers and hence only leaves them the possibility to react to changing conditions. Also, according to the theory of yin-yang, all opposite matters in the universe, which are interrelated with each other or two opposite aspects within one matter, can be defined as yin or yang. Rapid increase in levels of carbon dioxide in the atmosphere have significant impacts on agricultural systems and crop production due to increased carbon dioxide, ozone levels, changes in rainfall and seasonal temperature and increased pest, weed and diseases in plant canopies. Climate change and its effects will certainly increase in the near future, although the extent to which they do so cannot presently be determined. The influence of climate change on medicinal plants, in particular, has not been well studied and of course it is not fully understood. Climate change may become a more pressing issue for the herbal community, potentially affecting so many people. Agricultural crop production systems are extremely sensitive to climate changes such as changes in temperature and precipitation which can lead to increase number of pests and disease, thereby reducing harvest index and finally affects the food security of Asian countries, especially China. Improving water productivity and keep sustainable relations with environment, may decrease the adverse effect of climate change. The global cooperation is important for China to cope with the adverse impacts of climate change on food security and safety. The future researches in China should be for a better understanding of the responses of crops to changes in climate and influence of climate change on agricultural products, diseases, pests, and atmospheric constituents.

CONFLICT OF INTEREST

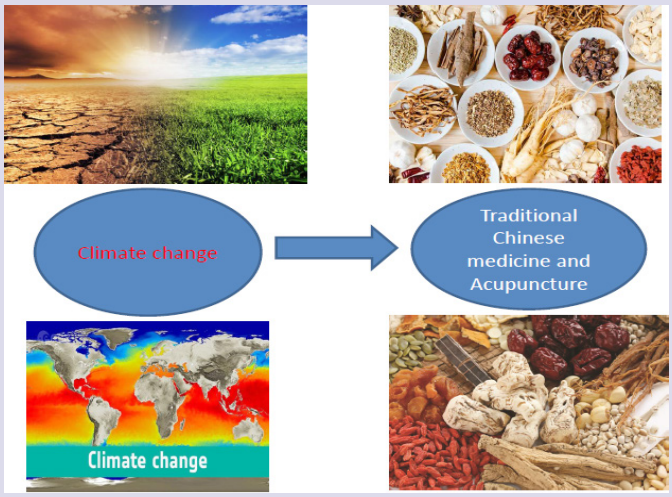
The authors declare no conflict of interest.

REFERENCES

1. Ge J, Hu Y, Guo L, Wang C, Sun W, Shahrajabian MH. Effects of GA_3 and ABA on the germination of dormant oat seeds. Cercetari Agronomice in Moldova. 2018;3(175):25-41.
2. Ogbaji PO, Li J, Xue X, Shahrajabian MH, Egrinya EA. Impact of bio-fertilizer or nutrient solution on Spinach (*Spinacea oleracea*) growth and yield in some province soils of P.R. China. Cercetari Agronomice in Moldova. 2018;2(174):43-52.
3. Shahrajabian MH, Sun W, Cheng Q. A review of goji berry (*Lycium barbarum*) in traditional Chinese medicine as a promising organic superfood and superfruit in modern industry. Academia Journal of Medicinal Plants. 2018;6(12):437-45.
4. Shahrajabian MH, Sun W, Cheng Q. The power of natural Chinese medicine, ginger and ginseng root in an organic life. Middle-East Journal of Scientific Research. 2019a;27(1):64-71.
5. Shahrajabian MH, Sun W, Cheng Q. Clinical aspects and health benefits of ginger (*Zingiber officinale*) in both traditional Chinese medicine and modern industry. Acta Agriculturae Scandinavica, Section B-Soil and Plant Science. 2019b;1-11.
6. Shahrajabian MH, Sun W, Cheng Q. Traditional Chinese medicine and agriculture; organic life and sustainability for future. GSC Biological and Pharmaceutical Sciences. 2019c;7(01):091-5.
7. Soleymani A, Shahrajabian MH. Changes in germination and seedling growth of different cultivars of cumin to drought stress. Cercetari Agronomice in Moldova. 2018;1(173):91-100.
8. Shahrajabian MH, Sun W, Cheng Q. A review of ginseng species in different regions as a multipurpose herb in traditional Chinese medicine, modern herbology and pharmacological science. Journal of Medicinal Plants Research. 2019d;13(10):213-26.
9. Shahrajabian MH, Khoshkharam M, Sun W, Cheng Q. The effect of pretreatment factors on seed germination and seedling growth of anise (*Pimpinella anisum* L.). Middle-East Journal of Science. 2019e;5(1):86-93.
10. Shahrajabian MH, Sun W, Cheng Q. Astragalus, an ancient medicinal root in traditional Chinese medicine, a gift from silk road. International Journal of Agriculture and Biological Sciences. 2019f;3(06):27-38.
11. Shahrajabian MH, Sun W, Cheng Q. Modern pharmacological actions of longan fruits and their usages in traditional herbal remedies. Journal of Medicinal Plants Studies. 2019g;7(4):179-85.
12. Shahrajabian MH, Khoshkharam M, Zandi P, Sun W, Cheng Q. Jujube, a superfruit in traditional Chinese medicine, heading for modern pharmacological science. Journal of Medicinal Plants Studies. 2019h;7(4):173-8.
13. Soleymani A, Shahrajabian MH. Response of different cultivars of fennel (*Foeniculum vulgare*) to irrigation and planting dates in Isfahan, Iran. Research on Crops. 2012;13(2):656-60.
14. Monteiro ALG, Faro AMCD, Peres MTP, Batista R, Poli CHEC, Villalba JJ. The role of small ruminants on global climate change. Acta Scientiarum. Animal Sciences. 2018;40:e43124.
15. Kang Y, Khan S, Ma X. Climate change impacts on crop yield, crop water productivity and food security- A review. Progress in Natural Science. 2009;19(12):1665-74.

16. Fang X, Su Y, Yin J, Teng JC. Transmission of climate change impacts from temperature change to grain harvests, famines and peasant uprisings in the historical China. Science China: Earth Sciences. 2015;58(8):1427-39.
17. Haque MA, Louis VR, Phalkey R, Sauerborn R. Use of traditional medicines to cope with climate-sensitive diseases in a resource poor setting in Bangladesh. BMC Public Health. 2014;14(1):202.
18. Dashtdar M, Dashtdar MR, Dashtdar B, Kardi K, Shirazi MK. The concept of wind in traditional Chinese medicine. Journal of Pharmacopuncture. 2016;19(4):293-302.
19. Kelly B. The yin and yang of climate change: Chinese medicine and cultural transformation. Journal of Chinese Medicine. 2012;98:51-4.

PICTORIAL ABSTRACT



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SUMMARY

- Climate change represents an external influence on agricultural production, which is beyond the control of producers and hence only leaves them the possibility to react to changing conditions.
- The theory of yin-yang, all opposite matters in the universe, which are interrelated with each other or two opposite aspects within one matter, can be defined as yin or yang.
- Rapid increase in levels of carbon dioxide in the atmosphere have significant impacts on agricultural systems and crop production due to increase carbon dioxide, ozone levels, changes in rainfall and seasonal temperature, and increase pest, weed and diseases in plant canopies.
- The influence of climate change on medicinal plants, in particular, has not been well studied and of course it is not fully understood.
- Medicinal crops, herbs and fruits production systems are extremely sensitive to climate changes such as changes in temperature and precipitation which can lead to increase number of pests and disease, thereby reducing harvest index and finally affects the food security of Asian countries, especially China.
- Improving water productivity and keep sustainable relations with environment, may decrease the adverse effect of climate change.
- The future researches in China should be for a better understanding of the responses of crops to changes in climate and influence of climate change on agricultural products, diseases, pests, and atmospheric constituents.